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EXAMINER	
TRAN, KHANH C	

ART UNIT	PAPER NUMBER
2631	

DATE MAILED: 06/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/911,840	CUMERALTO ET AL.	
	Examiner	Art Unit	
	Khanh Tran	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *8-10* is/are allowed.

6)☒ Claim(s) *1-7,11,12 and 14* is/are rejected.

7)☒ Claim(s) *13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The Amendment filed 03/30/2005 has been entered. Claims 1-14 are pending in this Office action.

Response to Arguments

2. Applicant's arguments with respect to claims 1, 3-4 and 11-12 have been considered but are moot in view of the new ground(s) of rejection.

3. The object of Drawings still stands in this Office action since there are no responses to the Drawings objection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 3-4 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glorioso et al. U.S. Patent 6,137,423.

Regarding claim 1, figure 1 illustrates a system 10 including:

Multiple remote meter interfaces (RMIs) 12 for reading meters 14, each of RMIs 12 is connected to a meter 14 for reading meter information from the meter

14 and transmitting the information wirelessly to a base station 16 as shown in figure 1, see column 2 line 64 through column 3 line 9. In column 3 line 48 via column 4 line 7, Glorioso et al. teaches that the wireless signals between the RMIs 12, base stations 16, and the master station 21 in the system 10 of figure 1 are signal bursts, wherein during each signal burst, the carrier signal *frequency hops* in pseudo-random sequence through fifty of one-hundred twenty-eight designated frequency channels within the frequency range. Glorioso et al. further discloses that the round trip of the signal bursts is less than four-hundred milliseconds long in order to meet a Federal Communications commission (FCC) regulation for spread spectrum communication. *In light of the foregoing disclosure*, the system 10 in figure 1 is a spread spectrum system corresponding to the claimed preamble "a spread spectrum meter reading system". The RMIs connected to meters 14, taught in Glorioso et al. invention, are equivalent to the claimed "plurality of end point encoder transmitter devices, each of which is connected to a utility meter". In regard to the claimed "high power frequency hopping spread spectrum signals", because the claim does not give a quantitative value for high power frequency hopping spread spectrum signal, it would have been obvious for one of ordinary skill in the art at the time the invention was made that the signal bursts, as defined in Glorioso et al. invention, are considered high power frequency hopping spread spectrum signals. The motivation is that the signal bursts comply with FCC regulation for spread spectrum communication, and hence, the signal bursts contain high enough

power for transmission while complying with FCC regulation for spread spectrum communication;

a plurality of base stations 16 in figure 1, wherein the number of base stations 16 is less than the number of RMIs 12. Each of the base stations 16 concentrates the meter reading information from several of the RMIs 12 and then passes the information. In one embodiment, the base stations 16 act as *repeaters* to pass the meter reading information to a master station 21, see column 3 lines 10-37. From the foregoing teachings, the base stations 16, acting as repeaters, are equivalent to the claimed "plurality of intermediate transceiver units", which receive and retransmit the meter reading information in the form of high power frequency hopping spread spectrum signal bursts;

In the embodiment of base stations 16 acting as repeaters as recited above, the base stations 16 pass the meter reading information to a master station 21. The master station 21 inherently has a receiver for receiving the meter reading information in the form of high power frequency hopping spread spectrum signal bursts, see column 3 lines 10-37. Glorioso et al. does not expressly teach a base station as set forth in the claimed application. However, because the master station 21 performs similar functions as the claimed station, the master station 21 is equivalent to the claimed "base station" for receiving high power frequency hopping spread spectrum signal bursts. Glorioso et al. further teaches that where the master station 21 is used, either or both of the base stations 16 and the master station 21 may concentrate the meter reading

information. There may be more than one master station 21 in the system 10 shown in figure 1. In light of the foregoing disclosure, a plurality of master stations 21 corresponds to the claimed plurality of base stations. The master station 21 receives any meter reading information from any the RMI 12 as claimed in the application claim.

Regarding claim 3, the claimed "one minute per hop" is equivalent to at least 0.0167 hops/second. Glorioso et al. teaches the meter reading information is carried by frequency shift key (FSK) modulation at a rate of about 2 kilobaud, see column 3 lines 63-67. A typical modulation is 8-ary FSK and assumes that 2 kilobaud is equivalent to 2000 bits per second (bps). Therefore, the symbol rate is R_s= 2000 bps / ($\log_2$ 8) = 667 symbols / second. Hence, a person of average skill in the art recognizes that if the frequency is hopped at least once per symbol up to once per 200 symbols, thus it translates into the hopping rate from 667 hops / second to 3.33 hops / second. Because the range of hopping rate, taught in Glorioso et al. invention, overlaps with the claimed limitation of *at least one minute per hop* (equivalent to 0.0167 hops/second) at a maximum hopping rate, thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made that the claimed limitation is considered prima facie obvious in view of Glorioso et al. teachings.

Regarding claim 4, as recited in claim 1, during each signal burst, the carrier signal *frequency hops* in pseudo-random sequence through fifty of one-hundred twenty-

eight designated frequency channels within the frequency range. Glorioso et al. further discloses that the round trip of the signal bursts is less than four-hundred milliseconds long in order to meet a Federal Communications commission (FCC) regulation for spread spectrum communication. Hence, the signal bursts, corresponding to the claimed high power frequency hopping spread spectrum signals include fifty of one-hundred twenty-eight designated frequency channels within the frequency range. As disclosed in column 6 lines 22-40, the data signal bursts has three predetermined frequency channels for frequency hopping when the RMI 26 (see figure 1) is being installed, and the data signal bursts has fifty predetermined frequency channels for frequency hopping when the RMI 26 (see figure 1) is being reinstalled. Glorioso et al. invention does not expressly disclose the claimed limitations "at least two of twenty five channels are reserved as acquisition. However, as recited above, because data bursts utilizes three predetermined frequency channels for frequency hopping when the RMI 26 (see figure 1) is being installed, and the data signal bursts uses fifty predetermined frequency channels for frequency hopping when the RMI 26 (see figure 1) is being reinstalled, it would have been obvious for one of ordinary skill in the art at the time the invention was made that the predetermined frequency channels are acquisition channels, and are reserved differently for each case as recited above. In view of that, at least three predetermined frequency channels for frequency hopping are used for acquisition channels, corresponding to the claimed features.

Regarding claim 11, as recited in claim 1, a system 10 as shown in figure 1 corresponds to the claimed utility meter reading system. The RMIs connected to meters 14, taught in Glorioso et al. invention, are equivalent to the claimed "plurality of end point encoder transmitter devices, each of which is operably connected to a utility meter". In column 3 lines 48-67, during each signal burst, the carrier signal frequency hops in a pseudo-random sequence through fifty frequency channels within the frequency range. Glorioso et al. expresses that when RMIs 26 is being re-installed after operating at some previous time the data signal burst has *fifty predetermined* frequency channels for frequency hopping; see column 6, lines 25-45. Therefore, RMI 26 rotates through all of available acquisition channels as claimed. Furthermore, it would have been obvious for one of ordinary skill in the art that Glorioso et al. teachings can be modified to utilize high speed frequency hopping to rotate through all of available acquisition channels. Motivation is that base station already has RMI ID previously stored in the memory.

As recited in claim 1, master station 21 receives meter reading information from a plurality of the RMIs 12. Hence, master station 21 corresponds to the claimed base unit.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Glorioso et al. U.S. Patent 6,137,423 as applied to claim 1 above, and further in view of Giles U.S. Patent 6,208,696 B1.

Regarding claim 2, as recited in claim 1, Glorioso et al. teaches the frequency hopping spread spectrum signal bursts meet the FCC regulation for spread spectrum communication. However, Glorioso et al. does not expressly disclose the FCC regulation is the FCC part 15.247.

Giles discusses the FCC part 15.247 in the Background of the Invention, the FCC part 15.247 specifies the use of a minimum of 50 channels, with a maximum time of 0.4 seconds spent on any one channel in a 20 second period. Glorioso et al. teaches the signal carrier frequency hops through 50 of 128 designated frequency channels within the frequency range. Glorioso et al. further disclose the round trip of the signal burst is less than 0.4 seconds long in order to meet a FCC regulation for spread spectrum communication. In light of the foregoing discussion, it would have been obvious for one of ordinary skill in the art at the time the invention was made that the FCC regulation mentioned in Glorioso et al. invention is the FCC part 15.247. The motivation is that the specification of the signal bursts to operate in Glorioso et al. system is similar the specification in accordance with the FCC part 15.247, see column 3 line 48 through column 4 line 7.

6. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nap et al. U.S. Patent 6,246,677 B1 in view of John Proakis, "Digital Communications", 4th Edition, August 15, 2000.

Regarding claim 5, Nap et al. invention is directed to an automatic meter reading data communication system having an integrated digital encoder and two-way wireless transceiver that is attachable to a wide variety of utility meters for meter data collection and information management. Figure 5 illustrates an automatic meter reading data communication system 20 having an interface management unit 22 which communicates with a gateway node 24 located remote from the interface management unit 22, see column 4 line 66 through column 5 line 15. Furthermore in column 5 lines 15-25, Nap et al. teaches that the interface management unit 22 is primarily a data gathering device that may be attached to a residential utility meter 28 such as a water or gas meter, for transmitting gathered data relating to consumed amounts of commodities, such as water or gas usage, to the gateway node 24. In light of that, the interface management unit 22 performs similar function as a meter end point encoder transmitter device as claimed in the preamble.

In column 7 lines 45-55, figure 7 illustrates a spread spectrum circuit board 44 within interface management unit 22 according to Nap et al. invention. The circuit board includes a RF transceiver 62, which corresponds to the claimed radio frequency sub-system. Nap et al., however, does not expressly teach the RF transceiver 62 transmits consumption data using frequency hopping spread

spectrum signal. Referring back to figure 4, the circuit board employs a spread spectrum processor 60 for performing direct sequence spread spectrum encoding of the data from communication micro controller 58 provided to RF transceiver 62 and decoding of the spread spectrum data from the RF transceiver, see column 8 lines 59-65. Nap et al. expresses that minimum shift keying (MSK) modulation is employed in order to allow reliable communications. As discussed by John Proakis in the textbook "Digital Communications", 4th Edition, August 15, 2000, on pages 192-194, MSK modulation is a special form of *binary* continuous phase *frequency shift keying* (FSK) modulation. Furthermore, on page 729, John Proakis expresses that a direct sequence (DS) spread spectrum signal when used in conjunction with *binary* or M-ary *FSK* is a frequency-hopped (FH) spread spectrum. In light of that, it would have been obvious for one of ordinary skill in the art at the time the invention was made that Nap et al. invention suggests frequency-hopping modulation employed for transmitting consumption data. The motivation for establishing prima facie case is Nap et al. teachings suggest MSK modulation employed in conjunction with direct sequence spread spectrum signal is, by technical definition, frequency-hopping modulation.

Nap et al. does not expressly teach a digital subsystem as set forth in the claim. However, in column 7 lines 45-55, the circuit board further includes a supervisory microcontroller 56, a communication microcontroller 58 and spread spectrum processor 70. In column 8 lines 1-35, during normal operation, micro

controller 56 is running at a predetermined clock speed. All other components in the interface management unit 22 are either in a low power "sleep" mode or have power completely removed from them. As result of that, micro controller 56 is running continuously while other components are in sleep mode as appreciated by one of ordinary skill in the art. When the communication microcontroller 58 is not performing communication activities, it is in sleep mode. Hence, the communication microcontroller 58 runs only upon utilization of the radio transceiver 62 as claimed in the instant application. In view of the foregoing discussion, the supervisory microcontroller 56, communication microcontroller 58 and spread spectrum processor 70 constitute the claimed digital subsystem, wherein the supervisory microcontroller 56 corresponds to the claimed first processor.

Nap et al. does not expressly teach a second processor unit as claimed. The communication microcontroller 58 and spread spectrum processor 70 are separate units, however, are part of communication subsystem. Because communication microcontroller 58 and spread spectrum processor 70 are in sleep mode when not in used and wakes up from time to time to ascertain whether an interrogating RP signal from gateway node 24. In view of that, one of ordinary skill in the art would have recognized that communication microcontroller 58 and spread spectrum processor 70 correspond to the claimed second processor. Furthermore, in column 7 line 60 through column 8 line 17, the micro controller 56 includes the data system supervisory timer, which controls

power management functions. As shown in figure 7, the supervisory microcontroller 56 controls the operation of RF transceiver 62 through communication microcontroller 58 and power switch. In column 7, lines 55-65, supervisory microcontroller 56 detects and accumulates pulses from utility meter transducer 64. The accumulated pulse totalization may be converter to corresponding units of commodity volume and the results displayed on LCD to provide a visual indication commodity consumption, which corresponds to the claimed message. In figure 7, supervisory microcontroller 56 exchanges messages to the communication microcontroller 58 via line serial out 152; see column 13, lines 35-45.

Nap et al. does not disclose supervisory microcontroller 56 provides frequency to be used to send message. However, in column 9, lines 10-30, communication to and from interface management unit 22 may be carried out in one of a preselected number, for example 24 channels in a preselected frequency band, for example 902-928 MHz. Interface management unit 22 receives data and transmits a response on a single RF channel, which is the same for both transmit and receive operation. As hereinafter described, the specific RF channel used for communication is chosen during commissioning and installation of the unit and loaded into memory. The RF channel is chosen to be different from the operating channels of other, adjacent interface management units, thereby to prevent two or more interface management units from responding to the same interrogation signal. A logical choice for storing the

specific RF channel is in the supervisory microcontroller 56. Motivation is supervisory microcontroller 56 runs continuously while other components are in sleep mode. Supervisory microcontroller 56 further detects and accumulates pulses from utility meter transducer 64, includes data systems supervisory timer controlling power management function.

Regarding claim 6, the supervisory microcontroller 56, corresponding to the claimed first processor, runs at a predetermined clock speed, for example 32.768 KHz, see column 8 lines 1-5. The spread spectrum processor generates the 2.4576 MHz clock signal for communication microcontroller 58, corresponding to the claimed second processor, see column 8, lines 60-67. In view of the foregoing, the supervisory microcontroller 56 operates at a low speed and the communication microcontroller 58 operates at a high speed.

Regarding claim 7, referring back to figure 7, the supervisory microcontroller 56 and the communication microcontroller 58 are two distinct processors.

6. Claims 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glorioso et al. U.S. Patent 6,137,423 as applied to claim 1 above, and further in view of Meyer et al. U.S. 6,778,099 B1.

Regarding claim 12, claim 1 rejection applies here because of similar scope. However, Glorioso et al. does not teach each of said plurality of buckets

as set forth in the claimed invention. Meyer et al. invention is directed to a communications module that permits remote meter reading of a utility meter via a wireless modem. In column 4, lines 15-20, see also figure 3. The meter 30 is typically read over the wireless network 80 at a predetermined time. The communication module 10 responds with the appropriate load profile data (e.g. for the previous 24 hours), time-of-use data, as well as any other data stored in the meter 30. In light of Meyer et al. teachings, the load profile data represents sequential period of time of consumption data as measured from the current time of the meter as claimed.

Glorioso et al. and Meyer et al. teachings are in the same field of endeavor. Therefore, it would have been obvious for one of ordinary skill in the art at the time of the invention that Glorioso et al. can be modified to include Meyer et al. teachings as discussed above. Motivation is that profile data is kept for a previous predetermined period of time for verification purposes and for determining user usage profile for future planning.

Regarding claim 14, the claimed limitations "a plurality of end point encoder transmitter devices as set forth in the claim", "a plurality of intermediate transceiver units as set forth in the claim" and "a base station as set forth in the claim" have been discussed in claim 1, and are rejected on the same ground as for claim 1.

Glorioso et al. does not teach the claimed limitations wherein each of the encoder transmitter devices and the transceiver units incorporates a transmission counter value as set forth in the claim".

Meyer et al. discloses a similar meter reading system as shown in figure 1. The meter reading system includes a host site 70, a wireless network 80, a communication module 10 and a meter 30. The host site 70, wireless network 80 comprising a base station, a communication module 10 and a meter 30 correspond to the master station 21, base station 16 as a repeater, a RMI 12, and meter 14 as taught by Glorioso et al. in figure 1. In view of the foregoing discussion, the communication module 10 corresponds to the claimed end point encoder transmitter device, and the host site 70 corresponds to the claimed base station. Referring back to Meyer et al. invention, in column 10 line 27 through column 11 line 20, the communication module 10 reads the meter clock and builds a time and date information message and sends it to the host 70 through the wireless network. Because the time and date information is used to determine the differences between meter time and host time, it would have been obvious for one of ordinary skill in the art at the time the invention was made that the time and date information acts as a transmission counter value as claimed. Furthermore, the communication module 10 provides the meter time, and to adjust the meter time, see column 10 lines 40-46. The host 70 determines whether or not the meter time is within the limit by comparing the transmission delay to the differences between meter time and host time, which corresponds to

a real time clock in the host 70 as appreciated by one of ordinary skill in the art. If the host determines that the meter time is off, the host 70 sends the communications module 10 the difference to adjust the meter time. Hence, the difference, corresponding to the claimed latency information, is calculated based on the meter time and host time. Further in view of that, the host 70 uses the host time as a time stamp on the received signal for determining the meter time accuracy in reference to the host time; see column 11 lines 5-20.

Glorioso et al. invention differs from Meyer et al. invention in that Glorioso et al. does not expressly teach using meter time and host time to determine the meter time accuracy. However, it is appreciated that the time and date information is needed for automating the meter reading process and, of course, for billing purposes, therefore, one of ordinary skill in the art would have been motivated to modify Glorioso et al. invention to incorporate Meyer et al. teachings as discussed above.

As recited in claim 1, Glorioso et al. does not expressly teach a base station as set forth in the claimed application. However, because the master station 21 performs similar functions as the claimed station, the master station 21 is equivalent to the claimed "base station" for receiving high power frequency hopping spread spectrum signal bursts. Glorioso et al. further teaches that where the master station 21 is used, either or both of the base stations 16 and the master station 21 may concentrate the meter reading information. There may be more than one master station 21 in the system 10 shown in figure 1. In light of

the foregoing disclosure, a plurality of master station 21 corresponds to the claimed plurality of base stations. The master station 21 receives any meter reading information from any the RMI 12 as claimed in the application claim.

Allowable Subject Matter

7.Claims 8-10 are allowed.

Regarding claim 8, claim 8 is allowable over the prior art of record since the cited references taken individually or in combination fails to particularly disclose a meter end point encoder transmitter device comprising uniquely distinct features "*wherein the digital subsystem is powered by a battery and wherein upon nearing a time for the radio frequency sub-system to transmit the digital subsystem directs a charge pump capacitor to charge, and once the charge pump capacitor is charged the digital subsystem enables at least a portion of the radio frequency sub-system to run off the charge pump capacitor during the consumption data transmission*". It is noted the closest prior art, Meyer et al. (US 6,778,099 B1), discloses a similar communication module that permits remote meter reading of a utility meter via a wireless modem. However, Meyer et al. fails to disclose "*wherein upon nearing a time for the radio frequency sub-system to transmit the digital subsystem directs a charge pump capacitor to charge*" as calimed in the instant application.

8. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 13, claim 8 is allowable over the prior art of record since the cited references taken individually or in combination fails to particularly disclose "*the base unit utilizes a time and frequency transmission collision avoidance scheme in combination with the bucket transmission*".

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 571-272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KCT

Khanh Cong Tran 06/24/2005

Examiner KHANH TRAN